The guidance provided here in "Base Map Specifications for New Digital Flood Insurance Rate Map Product" supersedes the guidance provided in Subsection 6.6.1 of *Guidelines and Specifications for Flood Map Production Coordination Contractors (Final Draft)*.

# Base Map Specifications for New DFIRM Product

In accordance with the Map Modernization objectives, FEMA has developed base map specifications for a new Digital Flood Insurance Rate Map (DFIRM) product. The new DFIRM product will exploit computer technology to allow for more efficient map updates, production, and distribution. It will also provide for cost-efficient, rapid conversion of the mapping inventory to a digital format. The new DFIRM product may be prepared for communities with adequate flood data and those for which new engineering work is required.

## Base Map Choice Priorities

Base map data supplied by communities or other non-Federal sources (e.g., State or regional agencies) that meet FEMA's criteria will be the first choice for new DFIRM production. Digital Orthophoto Quarter Quadrangles (DOQs) produced by the U.S. Geological Survey (USGS) will be the second choice and the default base map if suitable community data are not available. If neither suitable community base map data nor USGS DOQs are available for a county scheduled for new DFIRM production, FEMA will provide the community with information on base map sources, including information on partnering with USGS to initiate DOQ production for that county. DOQ production normally takes 12 to 14 months, so coordination with USGS needs to be initiated with that time frame and the new DFIRM production schedule in mind.

Road names that will be shown on the new DFIRMs will be derived from community-supplied files or hardcopy sources, current FIRM panels, and/or U.S. Bureau of the Census Topologically Integrated Geographic Encoding and Reference System (TIGER) files. Road names will be needed no matter what base map source is chosen for DFIRM production.

## Community Coordination

FEMA will coordinate with all of the communities within a county scheduled for new DFIRM creation at the beginning of the production process. Each community will be sent a letter that describes the DFIRM product, requests pertinent information, describes the minimum requirements for the submittal of data to be included in the new DFIRM product, and identifies the default base map source if community data are not available or suitable. Pertinent information that will be requested will include base map data; a current corporate limits map; elevation data, either electronic or hardcopy; and any engineering information that needs to be added to the FIRM. Communities will be encouraged to coordinate with other communities within the same county to provide FEMA with an integrated base map for the entire county.

## Minimum Standards for Community Supplied Data

In order for FEMA to use community supplied base map data instead of the USGS DOQs for new DFIRM production, the following minimum standards **must** be met.

- Resolution – The minimum resolution requirement for raster data files is 1 meter ground distance. Higher resolution data are also acceptable.

- Horizontal Accuracy – The base map data used by FEMA to produce a new DFIRM will employ the National Standard for Spatial Data Accuracy (NSSDA) to report horizontal accuracy. The NSSDA uses root-mean-square error reported in ground distances at the 95% confidence level. This means that 95% of the positions in the data set will have an error with respect to true ground position that is equal to or smaller than the reported accuracy value. The minimum horizontal positional accuracy for new DFIRM base map data will be that of the default base map – the USGS DOQs whose NSSDA accuracy is 38 feet. Data that meet higher accuracy standards are also acceptable.

- Vertical Accuracy – Vertical accuracy requirements for new DFIRM products will be defined under Map Modernization Objective 2.5 (Work Maps).

- Horizontal Reference System – The files must be georeferenced to a known projection and datum and be accompanied by information that describes those parameters.

- Data Sources – Community supplied data may be in the form of digital orthophotos or vector data files. Locally produced digital orthophotos may be at larger scales and higher resolution than USGS DOQs, but must meet USGS DOQ standards at a minimum. Aerial images that are not ortho-rectified are not acceptable. Vector files may be photogrammetrically compiled or digitized from orthophotos. Unacceptable vector file sources include TIGER files or other files compiled at scales smaller than 1:20,000.

- Currency – The data must have been created or reviewed for update needs within the last 7 years.

- Coverage – FEMA desires to receive complete and integrated data for an entire county. If only portions of a county are available, FEMA may choose to use the default base map source (USGS DOQs) for the county.

- Availability – The data must be available at the time of the initial coordination contact and must be sent within 30 days of receipt of FEMA's request.

- Restrictions on Use – FEMA must be able to print and distribute an unlimited number of hardcopy maps using the data. FEMA must also be able to freely distribute the base map data in raster format along with the floodplain information to the public.

- Contents – The files must contain all transportation features (roads, railroads, and airports) for the community. If digital orthophotos are supplied, these features must be clearly visible. If vector files are supplied they must also contain transportation features. Roads are considered to be those travel ways intended and maintained for use by motorized vehicles. In vector format, roads may be portrayed as road centerlines, edge of pavement, or right-of-ways.

  FEMA also desires to augment the USGS DOQs or community supplied transportation features with the following vector data:

  - Hydrographic features, including streams, rivers, lakes, and shorelines;
  - Current political boundaries, including those that define the county, corporate limits, extraterritorial jurisdictional areas, military lands, and Indian lands;
  - Parks or forest lands if applicable;
  - Range, township, and section lines if applicable; and
  - Feature names for all of the above features that have names. These may be provided as annotation/text features (preferred) or as attributes.

- Optional Contents – FEMA also desires the following features, if available:

  - Bridges;
  - Unimproved roads or trails. (i.e., those travel ways not intended for motorized vehicles or not usually used by motorized vehicles due to width or seasonal conditions);
  - Flood control structures, including levees, dams, weirs, floodwalls, jetties, etc.;
  - Elevation data in the form of contours and spot elevations, DEM or DTM data, a Triangulated Irregular Network (TIN), or mass points and break lines. If mass points and break lines are available, FEMA desires both those data and the resulting data that are derived from them;
  - Building footprints; and
  - Parcel outlines or parcel centroids.

- Thematic Separation of Data – Thematic data must be separated by level, layer, attribute, or file. In other words, the roads should be separated from the streams or corporate limits by one of the listed methods.

- File Format – The files must be submitted in one of the following file formats.

  - Raster Data
    Digital Orthophoto files may be submitted in TIF, BIP, or JPEG format.

  - Vector Data
    ARC/INFO export file – E00
    ArcView shape file – SHP
    MicroStation design file – DGN *
    MapInfo interchange format – MIF
    MapInfo native table format – TAB
    AutoCAD drawing file – DWG
    AutoCAD drawing exchange format – DXF
    Digital Line Graph – DLG
    Spatial Data Transfer Standard – SDTS

    * Preferred format

- Transfer Media – The files must be submitted on one of the following electronic media.

  - CD-ROM *
  - Zip disk
  - 8mm tape
  - 4mm tape
  - 3 ½ " diskette
  - Electronic transfer to FTP site
  - Electronic transfer by E-mail (for files under 2 MB)

    * Preferred medium

- Tiling – FEMA desires data in one single file or a series of thematic files that cover the entire geographic area of the community instead of individual small tiles that each cover a limited geographic area.

- Data Structure – Vector data files must meet the following data structure requirements.

  - Line features must be continuous (no dashes, dots, patterns, or hatching).
  - Files must not contain curves, B-splines, or arcs.
  - Files must not contain nested cells.
  - CADD files must not contain annotation generated from a database; the annotation must be placed as text.
  - There should be no gaps or overshoots between features that should close.

- Metadata – The files must be accompanied by metadata that complies with the FGDC metadata standards or a FEMA Digital Base Map Information Checklist that describes the files and their contents.

## Combining Data from Multiple Sources

FEMA desires to receive complete and integrated data for an entire county. If only portions of a county are available, FEMA may choose to use the default base map source (USGS DOQs) for the county. FEMA may also choose to combine data from multiple base map sources to prepare the new DFIRM product. This may entail piecing together data provided by adjoining communities or adjoining DOQs.

To facilitate fitting data together from multiple sources, FEMA may clip files at the edges. However, once a base map data source has been accepted, FEMA will use the locations of features in the base map data files as-is and will not modify the feature alignments that are provided. In some instances this may mean that there will be slight mismatches between communities as roads or other features cross community boundaries.

## Acknowledgment of Data Sources

FEMA will prepare an acknowledgment note that defines the source(s) of the digital base map data for DFIRM users and provides information on how to handle any issues that may arise when making determinations where two sources adjoin.